



Early Journal Content on JSTOR, Free to Anyone in the World

This article is one of nearly 500,000 scholarly works digitized and made freely available to everyone in the world by JSTOR.

Known as the Early Journal Content, this set of works include research articles, news, letters, and other writings published in more than 200 of the oldest leading academic journals. The works date from the mid-seventeenth to the early twentieth centuries.

We encourage people to read and share the Early Journal Content openly and to tell others that this resource exists. People may post this content online or redistribute in any way for non-commercial purposes.

Read more about Early Journal Content at <http://about.jstor.org/participate-jstor/individuals/early-journal-content>.

JSTOR is a digital library of academic journals, books, and primary source objects. JSTOR helps people discover, use, and build upon a wide range of content through a powerful research and teaching platform, and preserves this content for future generations. JSTOR is part of ITHAKA, a not-for-profit organization that also includes Ithaka S+R and Portico. For more information about JSTOR, please contact support@jstor.org.

supplement to the primary correspondence course. For those who undertook the reading course there might be available periodic (annual probably) examinations on the subjects dealt with in the volumes included. The satisfactory passing of this examination should naturally receive proper recognition, and a special certificate or diploma might be issued.

Undoubtedly many persons other than health officers would desire to take these correspondence courses because of their educational value. It would seem to be desirable to encourage this, and those thus taking the courses and passing satisfactory examinations might upon request be enrolled as members of a State Sanitary Reserve Corps. The members of such a corps would be frequently found of service and their enrollment would markedly add to their interest in local health affairs. They would be a source of strength to local health departments.

MOSQUITOES AND MALARIA.

REPORT ON A SHORT TRIP IN EASTERN NORTH CAROLINA.

By CH. WARDELL STILES, Professor of Zoology, United States Public Health Service.

Kinston, Moorehead City, and Jacksonville, all in eastern North Carolina, were visited to collect data in regard to the breeding places of mosquitoes, with special reference to malaria.

From both practical and theoretical points of view the mosquito problem of the places in question may be divided into an *external* and an *internal* problem.

The *internal problem* includes the mosquito-breeding places that are inside the town or in the immediate surroundings. The *external problem* includes the more distant breeding grounds, such as marshes, etc., from which mosquitoes may be blown into town under favorable conditions of wind, as light breezes from the direction of the marshes; or from which the mosquitoes may be brought in on railroad trains, or by persons driving in from the country.

The *internal problem* is, to a certain extent, dependent upon the *external problem*, for assuming that all of the mosquitoes in a town were to be killed off, the town might become infected again by mosquitoes blown in from the marshes or brought in on trains or in teams. Further, the importance of the *external problem* is dependent, to a great extent, upon the *internal problem*, for if mosquitoes are blown or brought into town, their invasion is a more serious matter in case they find in town places suitable for breeding than if the town presents no such breeding place.

It is difficult to state definitely the relative importance of the internal and the external problems in the places visited until the inter-

nal problem is solved, and thus eliminated from further consideration. The data collected prove, however, that in these three towns there is an easily remediable *internal* problem which, if not attended to, constitutes a serious menace to comfort and health, but which if properly handled can be practically solved; the solution will result in a great decrease of mosquitoes and malaria.

Intraurban Problem.

The internal mosquito problem of these three cities and towns consists (1) of a screening of the houses, and (2) a destruction of the local breeding places.

The subject of screening will not be discussed here except to take it for granted that every dwelling and every privy should be properly screened as a protection against flies and mosquitoes.

To a very large extent the local breeding places can be easily eliminated. To bring this point out it will be well to consider some of the more important breeding places noticed.

HOUSEHOLD PROBLEMS.

A considerable portion of the local mosquito problem centers at the home. Theoretically it might be expected that as soon as abuses are pointed out families would do away with them of their own accord. Practically, however, *education* in public-health measures—though not to be underestimated—will be utilized largely: (1) When the application of the knowledge in question can be shown to have a financial advantage, (2) when public health laws are properly enforced, or (3) when a practical application of the education does not involve much trouble or inconvenience.

(a) *Tin cans*.—From the number of empty tin cans observed in the towns in question, it may be assumed that the servant problem and the problem of purchasing fresh vegetables, fruits, and meats are not the least serious difficulties with which the housewife has to contend. After emptying the contents (meat, fruit, vegetables, fish, etc.) out of the cans, the average servant—and too often the housewife—throws the can out into the back yard, sometimes into a barrel, more commonly on the ground. Following a rain, these cans contain water and thus form breeding places for mosquitoes. In the case of a number of yards I examined, the housewife or the servant had in this manner provided the residences with an ample supply of mosquitoes. In some cans I found hundreds of mosquito larvæ and pupæ.

This particular element in the mosquito problem can be solved so easily that there is no excuse—except human nature—for its existence. When a can is opened and its contents emptied out, *the bottom of the can should be punctured or cut* with the can opener or with a

hatchet (and the can may be pressed flat by standing on it) so that it can not hold water, before it is thrown away. This simple precaution in the kitchen would reduce the mosquitoes in the three towns in question by hundreds of thousands. The importance of this reduction is seen when we consider that in these tin cans the mosquitoes are breeding close to the house.

In one instance I found thousands of mosquito larvæ and pupæ in an old tin can in a chicken house. Had this been emptied every day or week, when water was added, this source of mosquitoes would have been done away with.

Tin-can mosquitoes were found, for instance, as follows:¹

Kinston.—*Aedes calopus*² (seu *Stegomyia fasciata*) in the back yard of a physician. October 13, 1913.

Aedes calopus (seu *Stegomyia fasciata*) and *Culex pipiens* at side of a railroad track close to several houses. October 13, 1913.

Culex pipiens L. and *C. quinquefasciatus* Say, in back yard of tenement house. October 13, 1913.

Culex pipiens L. at side of railroad track, near freight station, from which or to which mosquitoes might be carried long distances in freight cars. October 14, 1913.

Jacksonville.—*Aedes calopus* Meig. (seu *Stegomyia fasciata*) in chicken coop.

At Moorehead City the public-school children were organized into a band of tin-can eradicators, and in two weeks' time the white school children collected and destroyed 36,202 cans.

(b) *Tin buckets*.—Old discarded paint pots were found in several instances near houses or along the railroad track, breeding mosquitoes by the thousands. If old paint pots were punctured before they are "thrown over the fence" this source of discomfort could be easily eliminated. The following is an instance of a small discarded tin paint pot:

Anopheles sp. (? *punctipennis* or ? *quadrimaculatus*), *Aedes calopus* (seu *Stegomyia fasciata*) and *Culex pipiens* L., in can at side of railroad track, near several houses. The can was literally swarming with the "wiggle-tails." Kinston, October 13, 1913.

(c) *Other tin receptacles*.—In one instance, in a back yard, there was a baby's bathtub containing water and furnishing hundreds of mosquitoes to the house about 20 feet away.

Culex pipiens, *Aedes calopus* (seu *Stegomyia fasciata*), and Psychodid larvæ. Jacksonville, October 16, 1913.

(d) *Bottles*.—Discarded bottles are numerous in these three towns. Many of these have caught water in one way and another and in a number of instances mosquito larvæ and pupæ were found. This part of the mosquito problem is of easy solution, namely, collect the bottles and destroy them or dispose of them in some other way.

¹ The notes in the smaller type show the kinds of mosquitoes found in each instance.

² All of the mosquitoes collected were forwarded to Dr. L. O. Howard, at whose request they were determined by Mr. F. Knab. This occasion is utilized to express my appreciation of their kindness.

In towns like the three under discussion, where many children go barefooted, especially in summer, the indiscriminate breaking of bottles in back yards, in lots, and in the streets would of course be a dangerous method of procedure. On account of the risk of cuts from broken glass this portion of the municipal problem should be handled by the municipality rather than by the families.

(e) *Kegs, barrels, and boxes*.—In a number of instances, kegs, barrels, and water-tight boxes in yards were found to be breeding mosquitoes. Some of the cases found were interesting.

In one instance, a store was bothered by mosquitoes. The proprietor had screened carefully and had, apparently, looked around to destroy the breeding places around his store. He had, however, overlooked a small keg in the yard, in which mosquitoes were breeding literally by the thousands, the following being found:

Aedes calopus, *Culex pipiens*, and *C. quinquefasciatus*. Jacksonville, October 16, 1913.

In another instance, two barrels were found in the yard of a store belonging to one of the town officials. The barrels held water and were breeding mosquitoes by the thousands.

Culex pipiens. Jacksonville, October 16, 1913.

The proprietor and town official in question well illustrates one of the most difficult parts of the mosquito problem, namely, the apathy of some persons in their duty toward other people. The fact that the conditions in the filthy yard back of his store and abutting several residences were furnishing thousands of mosquitoes to the neighborhood seemed to him to be a matter of superlative insignificance, but he showed some little irritation when the barrel was turned over by one of his neighbors to let out the water and kill the mosquitoes. Men of his type, with a mental horizon of very short radius, are of necessity a serious drawback to public-health work, especially when they hold office.

Several fire buckets and barrels in lumber yards and mills were breeding numerous mosquitoes.

Culex pipiens and *Aedes calopus* (*Stegomyia fasciata*). Kinston, October 14, 1913.

In a fire barrel at a certain cotton gin, mosquitoes were breeding by the thousands. When this fact was pointed out to the man in charge, he innocently remarked that this was of no consequence, as the water was not used for drinking purposes.

Culex pipiens. Kinston, October 13, 1913.

(f) *Old iron safes and stoves*.—In one yard there was an old iron safe, door side up, containing water, but a search for mosquitoes was negative. In a nearby vacant lot, however, there was another discarded old iron safe, door side up, and nearly full of water; here mosquitoes were breeding by the thousands. This one safe alone

was capable of furnishing an abundant supply of mosquitoes to all of the neighboring buildings.

Culex pipiens and *Aedes calopus* (seu *Stegomyia fasciata*).

In two instances, old discarded iron stoves were found. One of these was in a yard and did not happen to contain water. The other had been thrown into the street, close to a negro hut; it contained from 1 to 2 quarts of water which was swarming with thousands of mosquito larvæ and pupæ.

Culex pipiens. Moorehead City, October 15, 1913.

(g) *Open surface wells*.—In the one discarded open surface well examined mosquitoes were not found. This was doubtless merely a matter of chance.

(h) *Drainable standing water*.—In one yard several standing pools of water were found which seemingly presented ideal breeding places for mosquitoes, but a very careful search failed to reveal either larvæ or pupæ, although adults were seen flying. It seemed so incredible that such ideal breeding ground should not be utilized by the mosquitoes that the situation was studied more in detail, with the following result: These pools of water were on ground that was slightly higher than a creek that flowed through the yard; the configuration of the land was such that rainfall sufficient to raise the water in the pools by, say, one-half to 1 inch would inevitably result in making the pools overflow into the creek; the water would naturally carry with it substances floating on its surface; further, following any rain, water would of necessity drain from higher ground into the pools and from there into the creek; thus a rain would actually wash the pools out and mosquito larvæ and pupæ would be carried away in the overflow to the creek, which contained fish. We had here, therefore, an instance in which a rainfall would naturally result in a temporary decrease of mosquitoes, and since these pools seemed exceedingly favorable to the breeding of anopheline mosquitoes, the anomalous possibility was presented that a rainfall might actually result in a decrease of malaria. This line of reasoning is in harmony with an observation of the man who lived at the near-by house to the effect that this was an unfavorable time to find wiggletails there because the pools had been washed out by the rain.

General considerations.—In general the foregoing portions of the local mosquito problem depend upon the families, and right here lies one of the greatest difficulties in the eradication of mosquitoes and of malaria, because the average American family has very little interest in an improvement in public-health conditions. Families have been accustomed to these conditions for years, as were their fathers and their grandfathers. The average American father may be aware

of the fact that mosquitoes are breeding at his very door, but except in face of an epidemic he is not sufficiently interested in the subject to give himself a little trouble to do away with the nuisance. Furthermore, public-health sentiment is not sufficiently developed in the average American town to compel people to keep their premises free from nuisance. In other words, the average American man has a very irresponsible conscience when it comes to the expenditure of either personal effort or personal money to better the conditions in his own back yard as a factor in the general betterment of sanitary conditions in his community. Public-health advancement in the United States, at least in those portions with which I am acquainted, has been the result of determined persistency on the part of a few persons (who have made themselves unpopular by their efforts) rather than the result of either the general education or the general demand of the average citizen.

Because of this peculiarity on the part of the average American father the municipality has an important rôle to play in the household mosquito problem by inspecting premises to see that insanitary conditions are not permitted to continue. Education, in the sense of instruction, as to sanitary matters has accomplished about as much as can be expected of it, so far as the average adult American male citizen is concerned; as soon as a sufficient proportion of the younger generation, with higher sanitary ideals than their parents, gain sufficient power in local governments to enable them to carry on sanitary education in the police courts, by imposing fines, and thus by touching the average American father in a tender spot, more rapid improvement may be expected than we are experiencing to-day.

MUNICIPAL PROBLEMS.

It is impossible, either theoretically or practically, to draw a distinct line between the household problems and the municipal problems. As the individuals make up the household, the health of the individuals make up the health of the household, and as the separate households make up the municipality, the health and the sanitary surroundings of the separate families make up the health and sanitation of the municipality.

(a) *Drainable standing water*.—In one instance, close to a public school, there was an open lot in which was found a pool breeding numerous mosquitoes. (*Anopheles*, *Culex salinarius*, *Aedes trivittatus* Say. Moorehead City, October 15, 1913.) This case is slightly different from the pools in the backyards, in so far that no family is living on the premises, although families are living very close by. When a pool exists in the yard of an inhabited house, it is a little difficult to assume that the family is not aware of the fact, but the

owner of a vacant lot may live miles away and may be absolutely innocent of the fact that his lot is furnishing mosquitoes to near-by houses. Accordingly a greater obligation devolves upon the local officials to inspect such premises. In this particular case the pool in question required filling in and such treatment did not seem to present difficulties.

In another instance a sheet of standing water extended under several buildings and across an alley, the latter, according to information obtained, belonging to the city. Thousands upon thousands of mosquitoes were breeding here; in fact, this one breeding ground was sufficient to give a plentiful supply of mosquitoes to the entire neighborhood. This depression should be filled in, as it clearly constitutes a nuisance. Yet as long as the municipality permits its alley to be part of this sheet of water, it is a somewhat delicate matter to force the adjoining property owners (one a nonresident) to fill in their land.

Across the railroad track in front of a hotel in one of these towns is a depression with standing water. Abundant mosquitoes were breeding here to feed on the guests at the hotel. In fact, it was current comment that there was bitter complaint on the part of the guests because of the mosquitoes. It is not claimed that this was the only breeding place furnishing mosquitoes to this hotel, but rather that the possibilities here for mosquito breeding were sufficient to ruin the reputation of any hotel. According to the information obtained both the hotel and its near-by mosquito-breeding ground belong to the same corporation, hence it is a little difficult to understand why the one was permitted to continue to the detriment of the other. It would be an easy matter to fill in the depression or to drain it to a barrel sunken at its deepest point; the barrel (with side holes) could be kept supplied with kerosene or with small fishes; possibly the latter plan would be better than kerosene prophylaxis in this particular case, as surface water is said to be reached at this point at a depth of 1 to 2 feet, so that the fish could probably be kept alive almost indefinitely, and these would eat the larvæ and pupæ.

In another instance, in an inclosed field near a public school, there was a very slowly running—almost still-standing stream of water—in which mosquitoes were breeding. (*Anopheles* and *Culex territans* Walker. Jacksonville, October 16, 1913.) Very little work would have sufficed to clear this stream so that it would run more rapidly, to drain the field, and thus do away with this breeding ground.

(b) *Obstructed street gutters*.—In two of the three towns there were obstructed gutters in which thousands of mosquitoes were breeding. In both of these towns mosquitoes were breeding in gutters directly in front of public schools. In one gutter the number of mosquito larvæ was almost incredible. In another gutter, obstructed by grass

and within 15 feet of a residence, anopheline larvæ were found. In every one of these instances a slight interest, a slight intelligence, and a slight expenditure of energy would have done away with the existing nuisances.

(c) *Obstructed gutters at side of railroad tracks.*—In several instances excellent mosquito breeding grounds were found in the gutter-like depressions each side of railroad tracks.

The indignation, on the part of the inhabitants, against the railroad for permitting these conditions was nothing less than amusing. Persons who were absolutely blind to the nuisances they personally were maintaining in their own yards, and local officials who were absolutely blind to the example the municipality was setting to the inhabitants of the town, were vociferous in their denunciation of the railroad for the "outrage," etc., perpetrated on the community by permitting water to stand along the track and thus causing mosquitoes to defame the fair name of the town.

My field experience is to the effect that even the greatest obstructionist to public-health improvement in his own back yard, on his own property, or in his own town, is a natural-born orator when it comes to criticizing the railroads for their public-health shortcomings.

(d) *Boats.*—In two of the three towns small boats were found to be breeding large numbers of mosquitoes.

In one instance a rowboat had been drawn up on the shore and was about one-fourth filled with rain water, which was simply swarming with wiggle tails.

In another instance in the same town a small boat had been drawn up on the shore and had been left there about four to five months, according to the information obtained from boys in the neighborhood. This boat also was supplying mosquitoes to the near-by homes.

In other instances boats that were moored were found to contain water in which there were wiggle tails. (*Culex pipiens* in boat. Moorehead City. October 15, 1913.)

The Extraurban Problem.

In addition to the foregoing intraurban problems these towns (like other cities and towns) are faced by certain extraurban problems in connection with mosquitoes that are blown in from the marshes or brought in on railroad trains or in teams (carriages, wagons, etc.). It was, however, both interesting and significant to note that the average person with whom I discussed mosquitoes saw only the extraurban marsh problem.

(a) *Marshes.*—There are two points in particular that I desire to emphasize in connection with the marsh problem:

First. Without wishing to be interpreted as minimizing the importance of the marshes as breeding places for mosquitoes, I would sub-

mit (1) that it is impossible to give even a relatively approximate guess as to the degree of this importance until the intraurban mosquito problem is eliminated; (2) if the intraurban breeding places are eliminated—as they easily can be—the extraurban problem will be greatly decreased in importance, for the imported mosquitoes that do not find breeding places will be much less important than imported mosquitoes that do find breeding places; (3) so far as the three towns under consideration are concerned, the intraurban mosquito-breeding places are sufficient to keep up a goodly supply of mosquitoes independent of any extraurban supply; (4) the elimination of the intraurban breeding places (or at least most of them) in these three towns is a very simple matter dependent only upon intelligence, cooperation, persistency, a little physical effort, a relatively small expenditure of money, and the enforcement of rational local ordinances.

(b) *Agricultural and economic versus medical aspect of problem.*—The solution of the extraurban mosquito-breeding places is at present much more of an agricultural, engineering, and economic question than a public-health problem.

With the present relatively low density of population outside the towns in the rural districts visited, it is much more feasible to fight malaria and mosquitoes with quinine prophylaxis, by thoroughly screening against mosquitoes, by wearing light colored (white or yellow) clothing (instead of blues and black), and by eliminating the intraurban breeding places, than it is by draining the swamps which in some instances are extensive.

In its ultimate solution, the question of draining these swamps will depend upon (a) the economic question as to how much such draining will increase their money value from an agricultural point of view, and (b) the engineering question as to how feasible the draining is from an engineering point of view.

As neither of these questions is of zoological nature, I prefer not to express an opinion on them, but rather to insist that purely from the standpoint of protection against malaria and mosquitoes, drainage is neither the most feasible nor the only method at hand.

Kinds of Mosquitoes Collected.

While collecting the larvæ and pupæ, time was taken only to determine whether they were anopheline or culicine. They were all sent to Dr. L. O. Howard, and, at his request, were determined by Mr. F. Knab. In studying any given locality, specimens were taken only at a few of the many breeding places found. Arranged (1) by species, (2) by localities, and (3) by breeding places, the following insects were collected.

(1) MOSQUITOES ARRANGED BY SPECIES.

Aedes calopus Meigen (seu *Stegomyia fasciata*):

(a) In tin cans—

Jacksonville. In chicken house. October 16, 1913.

Kinston. In back yard of a physician. October 13, 1913.

At side of railroad track. October 13, 1913.

(b) In old tin paint pot—

Kinston. At side of railroad track, near houses. October 13, 1913.

(c) In discarded baby's bathtub—

Jacksonville. In back yard of home. October 16, 1913.

(e) In kegs, barrels, buckets, and boxes—

Jacksonville. In keg in yard of store. October 16, 1913.

Kinston. In barrel, at sawmill. October 16, 1913.

(f) In discarded old iron safe or stove—

Jacksonville. In open lot. October 16, 1913.

Aedes sollicitans Walker. Collected at Moorehead City. Breeding place not recorded.
October 15, 1913.*Aedes trivittatus* Say:

(h) In standing water—

Jacksonville. In pool near school. October 15, 1913.

Anopheles (? *punctipennis* or ? *quadrimaculatus*):

(b) In old tin paint pot—

Kinston. At side of railroad track. October 13, 1913.

(e) In buckets, etc.—

Moorehead City. In bucket, near shore. October 16, 1913.

(h) In standing water—

Jacksonville. In green, very slowly running, almost stagnant, streamlet,
back of school. October 16, 1913.

Kinston. In street gutter. October 14, 1913.

Moorehead City. In pool, close to school. October 15, 1913.

Culex pipiens L.:

(a) In tin cans—

Kinston. At side of railroad track. October 13, 1913.

In back yard of tenement house. October 13, 1913.

At side of railroad track. October 14, 1913.

(b) In old tin paint pot—

Kinston. At side of railroad track. October 13, 1913.

(c) In discarded baby's bathtub—

Jacksonville. In back yard of home. October 16, 1913.

(e) In kegs, barrels, buckets, and boxes—

Jacksonville. In keg, in yard of store. October 16, 1913.

Kinston. In barrel at cotton gin. October 14, 1914.

In barrel at sawmill. October 14, 1913.

Moorehead City. In bucket near shore. October 15, 1913.

(f) In old iron safes and stoves—

Jacksonville. In safe, in open lot. October 16, 1913.

Moorehead City. In stove, in street. October 15, 1913.

(h) In standing water:

Jacksonville. In pool, near river. October 16, 1913.

Kinston. In street gutter. October 14, 1913.

(i) In boats:

Jacksonville. In old boat on shore. October 16, 1913.

Culex quinquefasciatus Say.

(a) In tin cans:

Kinston. In back yard of tenement house. October 13, 1913.

(e) In kegs, barrels, and boxes:

Jacksonville. In yard of store. October 16, 1913.

(h) In standing water:

Kinston. In street gutter. October 14, 1913.

Culex restuans Theobald.

(h) In standing water:

Kinston. In street gutter. October 14, 1913.

Culex salinarius Coq.

(h) In standing water:

Kinston. In street gutter. October 14, 1913.

Moorehead City. In pool, close to school. October 15, 1913.

Culex territans Walker.

(h) In standing water:

Jacksonville. In green, very slowly running, almost stagnant streamlet, back of school. October 16, 1913.

Psorophora (Janthinosoma) columbiae.

(h) In standing water:

Kinston. In street gutter. October 14, 1913.

Stegomyia fasciata see *Aedes calopus*.

(2) MOSQUITOES ARRANGED BY LOCALITY.

Jacksonville, Onslow County, N. C.—*Aedes calopus* (seu *Stegomyia fasciata*), *A. trivittatus*, *Anopheles*, *Culex pipiens*, *C. quinquefasciatus*, *C. territans*.

Kinston, Lenoir County, N. C.—*Aedes calopus* (seu *Stegomyia fasciata*), *Anopheles*, *Culex pipiens*, *C. quinquefasciatus*, *C. restuans*, *C. salinarius*, *Psorophora (Janthinosoma) columbiae*.

Moorehead City, Carteret County, N. C.—*Aedes sollicitans*, *Anopheles*, *Culex pipiens*, *C. salinarius*.

(3) MOSQUITOES ARRANGED BY BREEDING PLACES.

(a) In tin cans.—*Aedes calopus* (seu *Stegomyia fasciata*), *Culex pipiens*, *C. quinquefasciatus*.

(b) In old tin paint pot.—*Aedes calopus* (seu *Stegomyia fasciata*), *Anopheles* sp., *Culex pipiens*.

(c) In other old tin receptacles.—*Aedes calopus* (seu *Stegomyia fasciata*), *Culex pipiens*.

(e) In barrels, boxes, buckets, or kegs.—*Aedes calopus* (seu *Stegomyia fasciata*), *Anopheles* sp., *Culex pipiens*, *C. quinquefasciatus*.

(f) In discarded old iron safe or stove.—*Aedes calopus* (seu *Stegomyia fasciata*), *Culex pipiens*.

(g) In stagnant water.—*Aedes trivittatus*, *Anopheles* sp., *Culex pipiens*, *C. quinquefasciatus*, *C. restuans*, *C. salinarius*, *C. territans*, *Psorophora (Janthinosoma) columbiae*.

(h) In boats.—*Culex pipiens*.